

June 2017. Remedial exam.

1st term. Lessons 1 to 3. Natural numbers. Powers and roots. Divisibility

1. Calculate the quotient and the remainder for the division: $2572835 : 738$

$$\begin{array}{r} 2572835 \quad \overline{) 738} \\ 3588 \\ \underline{6363} \\ 4595 \\ \underline{167} \end{array}$$

2. Calculate the least common multiple and the highest common factor of 54 and 126.

$$\begin{array}{l} 54 \mid 2 \\ 27 \mid 3 \\ 9 \mid 3 \\ 3 \mid 3 \\ 1 \end{array} \quad \begin{array}{l} 126 \mid 2 \\ 63 \mid 3 \\ 21 \mid 3 \\ 7 \mid 7 \\ 1 \end{array}$$
$$2 \cdot 3^3 \quad 2 \cdot 3^2 \cdot 7$$

$$\begin{aligned} \text{l.c.m.} &= 2 \cdot 3^3 \cdot 7 = \underline{378} \\ \text{H.C.F.} &= 2 \cdot 3^2 = \underline{18} \end{aligned}$$

3. A farmer sells 85 olive trees for 120€ each and 65 walnut¹ trees for 175€ each.

a) How much does he get?

b) He buys 120 orange trees with the earnings² and he keeps³ 2375€. How much is an orange tree?

$$\begin{aligned} \text{a) } 85 \times 120 &= 10200; \quad 65 \times 175 = 11375 \\ 10200 + 11375 &= \underline{21575} \\ \text{b) } 21575 - 2375 &= 19200; \\ 19200 : 120 &= \underline{160 \text{ orange trees}} \end{aligned}$$

¹ nuez

² ganancias

³ quedarse

4. Simplify the following expressions using the properties of powers:

$$a) 2^3 : 2 = b) x^3 \cdot x \cdot x^0 = c) (x^2)^5 = d) (2^2 \cdot 2^3 \cdot 2^5) : (2^3 \cdot 2^4) = e) 8^5 \cdot 4^5 =$$

$$a) 2^3 : 2 = 2^{3-1} = 2^2 \quad b) x^3 \cdot x \cdot x^0 = x^{3+1+0} = x^4 \quad c) (x^2)^5 = x^{2 \cdot 5} = x^{10}$$

$$d) (2^2 \cdot 2^3 \cdot 2^5) : (2^3 \cdot 2^4) = (2^{2+3+5}) : (2^{3+4}) = 2^{10} : 2^7 = 2^{10-7} = 2^3$$

$$e) 8^5 \cdot 4^5 = (2^3)^5 \cdot (2^2)^5 = 2^{3 \cdot 5} \cdot 2^{2 \cdot 5} = 2^{15} \cdot 2^{10} = 2^{15+10} = 2^{25}$$

2nd term. Lessons 4 to 8. Integers. Decimal numbers. Decimal metric system. Fractions

5. Calculate: $-2 + 4 : (6 - 8) - (2 - 7) - 2 \cdot (-5 + 3 \cdot 2) =$

$$= -2 + 4 : (-2) - (-5) - 2(-5 + 6) =$$

$$= -2 - 2 + 5 - 2 \cdot (1) = -2 - 2 + 5 - 2 = -1$$

6. A tap¹ gets 2'5 litres of water per minute. How long does it take to fill a pool² of 24'5 m³?

$$24'5 \text{ m}^3 = 24'5 \cdot 1000 = 24500 \text{ l}$$

$$24500 : 2'5 = 9800 \text{ m} : 60 \stackrel{\sim}{=} 163 \text{ h} : 24 = 6'8 \text{ days}$$

7. Get the resulting simplest fraction: $\left(\frac{5}{3} - \frac{2}{7}\right) : \left(\frac{2}{3} \cdot 10 - 7\right) =$

$$\left(\frac{35}{21} - \frac{6}{21}\right) : \left(\frac{20}{3} - \frac{21}{3}\right) = \frac{29}{21} : \frac{-1}{3} = \frac{29 \cdot 3}{21} = \frac{29 \cdot \cancel{3}}{7 \cdot \cancel{3}} = \frac{29}{7}$$

8. Calculate the decimal value for the following fractions and classify them according to the result. Include the operation to get the decimal expression for each.

$$a) \frac{23}{6} = 3,8\bar{3} \text{ decimal periódico}$$

$$b) \frac{221}{17} = 13; \text{ número entero}$$

$$c) \frac{102}{8} = 12'75; \text{ decimal finito}$$

¹ grifo

² estanque

3rd term. Lesson 9 to 13. Proportionality and percentages. Algebra. Lines and angles. Geometric figures. Perimeters and areas.

9. Two workers spend¹ 24 hours to do a job.
 a. How long do 3 workers spend on it?
 b. How many workers are necessary to do this in 6 hours?

a)

Hours		N° workers
24	—	2
x	—	3

$$x = \frac{24 \cdot 2}{3} = \underline{16 \text{ hours}}$$

b)

Hours		N° workers
24	—	2
6	—	x

$$x = \frac{24 \cdot 2}{6} = \underline{8 \text{ workers}}$$

10. John get a 7'5% discount for a pair of boots priced €120 before the discount. How much does he pay?

$100 - 7'5 = 92'5\%$ John must pay

$$120 \cdot 0'925 = 111€$$

11. Solve the equation and check the solution: $-4x - 2(3 + 4x) = -3(x - 5) + 6$

$$-4x - 6 - 8x = -3x + 15 + 6$$

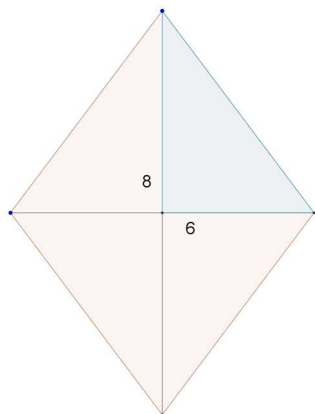
$$-4x - 8x + 3x = 15 + 6 + 6$$

$$-9x = 27 ; x = \frac{27}{-9} = \boxed{-3}$$

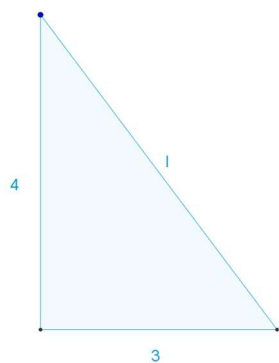
¹ emplear

12. a) Draw a rhombus whose diagonals are 8 cm and 6 cm? (You must draw the rhombus with rulers and according to the data)
b) Calculate the side by using formulas.
c) Calculate the surface area.

a)



b)



$$l^2 = 3^2 + 4^2 = 9 + 16 = 25; l = \sqrt{25} = 5\text{ cm}$$

c) $A = \frac{D \cdot d}{2} = \frac{8 \cdot 6}{2} = \frac{48}{2} = 24\text{ cm}^2$